

CLAIMS

1. An image forming apparatus comprising:
 - a plurality of image carriers on which images are formed based on image data;
 - a transfer carrier on which different color component images formed on said respective image carriers are superimposed sequentially with a movement of said transfer carrier in a sub-scanning direction;
 - a position changing section for changing a superimposing position of the different color component images;
 - a density detecting section for detecting a density average value of each combined image formed by superimposing the different color component images, for a plurality of combined images formed by superimposing the different color component images at respectively different positions; and
 - a position determining section for determining a superimposing position of the different color component images, based on detection results of said density detecting section,
- wherein each of the plurality of combined images is formed separately for each image carrier with respect to a length related to a circumference length of the image carrier, and
- said image forming apparatus comprises a combined-image adjusting section for forming a combined image so that said density detecting section detects a density of the combined image at plural

and substantially equal pitches within a range of at least one circumference length of said image carrier, or so that said density detecting section detects a density average value of the combined image at plural and substantially equal pitches within a range of at least one circumference length of said image carrier.

2. The image forming apparatus of claim 1, wherein
a length in sub-scanning direction of the combined image formed by said combined-image adjusting section is a length substantially s times the circumference length of said image carrier.

3. The image forming apparatus of claim 2, wherein
the length substantially s times the circumference length of said image carrier is a length calculated by adding a sub-scanning direction length of a detection surface of said density detecting section to a length s times the circumference length of said image carrier.

4. The image forming apparatus of claim 2, wherein
said s is a positive integer.

5. The image forming apparatus of claim 2, wherein
said s is expressed as $1/(2t)$ when t is a natural number not less than 2, and
 t same combined images are formed continuously so that a

pitch of said same combined images is $1/t$ times the circumference length.

6. The image forming apparatus of claim 5, wherein said t is 2.

7. The image forming apparatus of claim 1, wherein the different color component images are composed of a reference image of a color component whose superimposing position is fixed and a correction image of a color component to be subjected to superimposing position adjustment, and

in each of the combined images formed by superimposing the different color component images at respectively different positions, the superimposing positions of the correction images with respect to the reference images are shifted from each other by a fixed distance.

8. The image forming apparatus of claim 7, wherein when forming a new combined image by changing the superimposing position of the correction image, the new combined image is formed continuously, without an interval, after a previous combined image formed before changing the superimposing position.

9. An image forming apparatus comprising:

a plurality of image carriers on which images are formed based on image data;

a transfer carrier on which different color component images formed on said respective image carriers are superimposed sequentially with a movement of said transfer carrier in a sub-scanning direction;

a transfer carrier driving section for driving and rotating said transfer carrier;

a position changing section for changing a superimposing position of the different color component images;

a density detecting section for detecting a density average value of each combined image formed by superimposing the different color component images, for a plurality of combined images formed by superimposing the different color component images at respectively different positions; and

a position determining section for determining a superimposing position of the different color component images, based on detection results of said density detecting section,

wherein each of the plurality of combined images is formed separately with respect to a length related to a circumference length of said transfer carrier driving section, and

said image forming apparatus comprises a combined-image adjusting section for forming a combined image so that said density detecting section detects a density of the combined image at plural and substantially equal pitches within a range of at least one

circumference length of said transfer carrier driving section, or so that said density detecting section detects a density average value of the combined image at plural and substantially equal pitches within a range of at least one circumference length of said transfer carrier driving section.

10. The image forming apparatus of claim 9, wherein a length in sub-scanning direction of the combined image formed by said combined-image adjusting section is a length substantially s times the circumference length of said transfer carrier driving section.

11. The image forming apparatus of claim 10, wherein the length substantially s times the circumference length of said transfer carrier driving section is a length calculated by adding a sub-scanning direction length of a detection surface of said density detecting section to a length s times the circumference length of said transfer carrier driving section.

12. The image forming apparatus of claim 10, wherein said s is a positive integer.

13. The image forming apparatus of claim 10, wherein said s is expressed as $1/(2t)$ when t is a natural number not less than 2, and

t same combined images are formed continuously so that a pitch of said same combined images is $1/t$ times the circumference length.

14. The image forming apparatus of claim 13, wherein said t is 2.

15. The image forming apparatus of claim 9, wherein the different color component images are composed of a reference image of a color component whose superimposing position is fixed and a correction image of a color component to be subjected to superimposing position adjustment, and

in each of the combined images formed by superimposing the different color component images at respectively different positions, the superimposing positions of the correction images with respect to the reference images are shifted from each other by a fixed distance.

16. The image forming apparatus of claim 15, wherein when forming a new combined image by changing the superimposing position of the correction image, the new combined image is formed continuously, without an interval, after a previous combined image formed before changing the superimposing position.

17. A color superimposition adjustment method of an image forming apparatus, comprising the steps of:

forming images on a plurality of image carriers, based on image data;

sequentially superimposing different color component images formed on said respective image carriers, on a transfer carrier moving in a sub-scanning direction;

changing a superimposing position of the different color component images;

detecting a density average value of each combined image formed by superimposing the different color component images, in a density detection section, for a plurality of combined images formed by superimposing the different color component images at respectively different positions; and

determining a superimposing position of the different color component images, based on detection results of said density detecting section,

wherein each of the plurality of combined images is formed separately for each image carrier with respect to a length related to a circumference length of the image carrier, and

said method comprises a combined-image adjusting step for forming a combined image so that said density detecting section detects a density of the combined image at plural and substantially equal pitches within a range of at least one circumference length of said image carrier, or so that said density detecting section detects a

density average value of the combined image at plural and substantially equal pitches within a range of at least one circumference length of said image carrier.

18. The color superimposition adjustment method of an image forming apparatus of claim 17, wherein

a length in sub-scanning direction of the combined image formed by the combined-image adjusting step is a length substantially s times the circumference length of said image carrier.

19. The color superimposition adjustment method of an image forming apparatus of claim 18, wherein

the length substantially s times the circumference length of said image carrier is a length calculated by adding a sub-scanning direction length of a detection surface of said density detecting section to a length s times the circumference length of said image carrier.

20. A color superimposition adjustment method of an image forming apparatus, comprising the steps of:

forming images on a plurality of image carriers, based on image data;

sequentially superimposing different color component images formed on said respective image carriers, on a transfer carrier which is moving in a sub-scanning direction with a rotation

of a transfer carrier driving section;

changing a superimposing position of the different color component images;

detecting a density average value of each combined image formed by superimposing the different color component images, in a density detection section, for a plurality of combined images formed by superimposing the different color component images at respectively different positions; and

determining a superimposing position of the different color component images, based on detection results of said density detecting section,

wherein each of the plurality of combined images is formed separately with respect to a length related to a circumference length of said transfer carrier driving section, and

said method comprises a combined-image adjusting step for forming a combined image so that said density detecting section detects a density of the combined image at plural and substantially equal pitches within a range of at least one circumference length of said transfer carrier driving section, or so that said density detecting section detects a density average value of the combined image at plural and substantially equal pitches within a range of at least one circumference length of said transfer carrier driving section.

21. The color superimposition adjustment method of an

image forming apparatus of claim 20, wherein

a length in sub-scanning direction of the combined image formed by the combined-image adjusting step is a length substantially s times the circumference length of said transfer carrier driving section.

22. The color superimposition adjustment method of an image forming apparatus of claim 21, wherein

the length substantially s times the circumference length of said transfer carrier driving section is a length calculated by adding a sub-scanning direction length of a detection surface of said density detecting section to a length s times the circumference length of said transfer carrier driving section.